

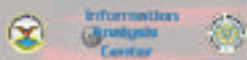
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Defense Technical Information Center
ATN: DTIC-AI
8735 John J. Kingman Road, Suite 0944
Fort Belvoir, WA 22540-6218
Commercial: 703.297.9120
DSN: 427.3120
FAX: 703.297.9119
E-mail: dtic@dtic.mil

NTIAC

Nondestructive Testing IAC

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Story 1

Story 2

Aging Aircraft Maintenance Depends on Effective Nondestructive Evaluation

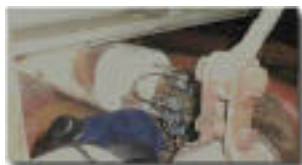
NTIAC is playing an important role in maintaining aircraft airworthiness over unprecedented lifespans. The challenge to the military, the FAA, and the aviation industry is to assure adequate inspection and maintenance of both structural and non-structural components of an aircraft as long as it remains in service. As airplanes age, the need to inspect, repair, or replace parts changes, increasing over time. And the maintenance of aging aircraft affects fleet readiness.



As aircraft get older, the primary threats are widespread fatigue, damage, and hidden corrosion, which degrades the structural integrity of the aircraft. Specific needs for aging aircraft include the detection of fatigue cracks under fasteners; small cracks associated with widespread fatigue damage; hidden corrosion; cracks and corrosion in multi-layer structures; and stress corrosion cracking in thick sections.

[Continued on Story 1](#)

Quick Turnaround Qualification of Insulated Piping System



Guided wave inspection of inaccessible piping that is sandwiched between the wall and a large generator.

Aboard USS Stump (DD 978) corrosion under insulation on shipboard piping is a serious problem, in particular as ships get older. Visual inspection techniques that require removal of pipe insulation are prohibitively expensive in both labor and material costs, and are very time consuming. Responding to a request by the Port Engineer for the USS Stump (DD 978), NTIAC applied the newly developed guided wave ultrasonics NDE technology to inspect bleed air piping on the USS Stump. The bleed air piping is a high temperature system that is fully insulated.

The request was made by the Stump's Port Engineer because the ship had experienced an unexpected failure in the bleed air piping during a previous deployment and a rapid turnaround was needed since the ship was to be redeployed shortly.

[Continued on Story 2](#)

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Database Technology Information Center
ATTN: DTC-41
8725 John J. Kingman Road, Suite 0844
Fort Belvoir, VA 22060-6218
Commercial FID 2675120
DSN: 432-9120
FAX: 703.357.5119
E-mail: dtc@dtic.mil

Story 2



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Defense Research Information Center
ATTN: DTIC-AJ
8725 John J. Kingman Road, Suite 0044
Fort Belvoir, WA 22088-4328
Commercial: 703.767.9829
DSN: 437-0028
FAX: 703.767.9119
E-mail: ac@dtic.mil

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Nondestructive Testing IAC

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Story 1

Story 2

Quick Turnaround Qualification of Insulated Piping System Aboard USS Stump (DD 978) (continued)

NTIAC had previously participated in development of the guided wave ultrasonics NDE technology under sponsorship of the Office of Naval Research. Using guided waves travelling down the length of an insulated pipe, this technology is capable of detecting corrosion pitting and generalized wall thinning with removal of only minimal patches of insulation periodically for application of the sensors to the pipe. Using this technology, pipe lengths 20 to 30 feet long can be inspected without removing insulation.

NTIAC demonstrated application of the guided wave technology by inspecting approximately 180 feet of bleed air piping aboard the USS Stump in Norfolk, Virginia. Although the vast majority of the piping was found to be fit for service, areas suspected to contain damage were marked for additional inspection by the Navy prior to redeployment and to direct monitoring of the piping systems during sea operations.

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Guided wave inspection of bleed air piping in an engine room; guided waves travel in the pipe, around the bend and down to a flange on the deck below.